

**Title: METHOD AND APPARATUS FOR A MULTIPLE SOURCE VAPOR-DISPENSING DEVICE**

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**Cross-Reference to Related Applications**

[0001] This application claims priority to United States Provisional Patent Application Serial No. 60/407,384 entitled "Method and Apparatus for a Multiple Source Vapor-Dispensing Device," filed August 30, 2002, and is incorporated herein by reference.

**Field of Invention**

[0002] This invention relates, generally, to vapor-dispensing devices and, in particular, to a vapor-dispensing device that facilitates evaporation of multiple volatizable materials into an environment.

**Background of the Invention**

[0003] Indoor air fresheners consisting of a source of fragrant material and a dispersion system for projecting material vapor into the air have been used for many years. Liquids, solids, and gels have been used as material sources. Dispersion systems also have included evaporation regions such as the surface of a gelatinous material source or, as in U.S. Patent No. 4,919,981, the leaf or center of a decorative artificial flower. Many of these systems have included a cover, such as for use in connection with a gelatinous air freshener, which can be raised and lowered to affect the amount of fragrant vapor released.

[0004] Notwithstanding these existing devices and systems, there is a long-felt and so far unsatisfied need, however, for an indoor vapor dispensing device such as an air freshening system which allows more than one source of fragrant material to be dispersed into the environment from a single device. The need for a device that permits

the user to control the release of the materials without undue physical manipulation of the device is particularly acute.

### **Summary of the Invention**

[0005] The present invention provides a vapor-dispensing device that, through a delivery system, facilitates evaporation of multiple volatizable materials from an evaporation region into an environment.

[0006] In accordance with one embodiment the evaporation region comprises a single region through which two or more volatizable materials may pass into the environment. In accordance with another embodiment a controller is employed to facilitate controlled delivery of the two or more volatizable materials into the environment

### **Brief Description of the Drawing**

[0007] The subject invention will hereinafter be described in conjunction with the appended drawing figures, wherein like numerals denote like elements, and:

[0008] Fig. 1 is a schematic overview of a system providing a context in which the present invention may be practiced;

[0009] Fig. 2 is a schematic view of exemplary a vapor-dispensing device in accordance with the present invention; and,

[0010] Fig. 3 is a schematic view of a further exemplary vapor dispensing device.

### **Detailed Description**

[0011] Systems and methods in accordance with the present invention generally provide for a vapor-dispensing device that, through a delivery system, facilitates evaporation of multiple volatizable materials into an environment.

[0012] Referring to Fig. 1, a vapor-dispensing device in accordance with the present invention generally comprises a delivery system 2000 communicating with a first

volatizable material 102, a second volatizable material 104, a controller 402, and an environment 130.

[0013] Volatizable materials 102 and 104 generally comprise any material which may vaporize. More specifically, volatizable materials 102 and 104 may comprise one or more suitable liquids, waxes, colloids, gels, solids, or other form of matter which may be caused to evaporate, sublimate, or otherwise transformed to a vapor. For example, volatizable materials 102 and 104 may each comprise one or more different natural or synthetic oil bearing fragrances, such as floral, citrus, exotic spices, and the like. But any material which may be volatized into an environment, whether now known or hereinafter devised, may be used in the present invention.

[0014] For example, materials 102 and 104 may comprise fragrance containing materials, insecticides or other materials. In accordance with various aspects of the present invention, the volatizable materials can be any number of conventional materials dispensed from vapor dispensers including fragrances, disinfectants, sanitizing agents, insect repellants, insecticides and the like. Preferably, and in accordance with a preferred aspect of the present invention, at least one of materials 102 and 104 comprises a fragrance material and system 2000 is used as a air freshening device.

[0015] In certain applications, various combinations of materials may be desirable. For example, material 102 may comprise one fragrance, for example, a strawberry fragrance containing material, and material 104 may comprise another complimentary fragrance, for example, a crème fragrance containing material. Alternatively, material 104 may comprise another material, for example, an insecticide or other material. Of course, various combinations of materials may be employed in connection with the various embodiments of the present invention.

[0016] Volatizable materials 102 and 104 may be attached to the delivery system 2000 or otherwise contained or maintained in position to suitably communicate with the delivery system 2000 by any method now known or hereinafter devised. Also, volatizable materials 102 and 104 may be physically separated from, or in the alternative, maintained in physical contact with one another. Where the volatizable materials 102 and 104 are physically separated, the separation can be accomplished with a suitable boundary such as a common wall, or the separation can be accomplished by means of containers. For example, containers such as reservoirs, bottles, or other such containers may be used to separate volatizable materials 102 and 104. While Fig. 2 demonstrates one embodiment of volatizable materials 102 and 104, any structure capable of separating these volatizable materials, where desired, whether now known or hereinafter devised, may be used in the present invention.

[0017] Controller 402 can be any device which suitably enables some level of control of the way in which, the amount of, or any other characteristic relating to the release of materials 102 and 104 into the environment. For example, in accordance with one embodiment, controller 402 may be operable to adjust the relative or absolute amounts of volatizable materials 102 and 104 released into the environment 130 at rates preferred by the user. In accordance with another embodiment, controller 402 may be suitably configured to enable alternative, or other modified actuation of system 2000 to facilitate release of materials 102 and 104. For example, controller 402 may use one or more types of power, including electrical, mechanical, heat, or other sources or combinations of sources. Controller 402 may, for example, comprise a heating element that is selectively controlled to facilitate selective volatization of materials 102 and 104.

[0018] Inasmuch as the operation of liquid vaporizers is generally known to those of skill in the art, the operation will not be described in detail herein. Suffice it to say, however,

that in accordance with various aspects of a preferred embodiment of the present invention, system 2000 may be plugged into a conventional electrical outlet thereby causing a heater unit (not shown) to heat materials 102 and 104, perhaps via transfer mechanism 110 discussed in greater detail hereinbelow, to permit the vaporized liquid which has been drawn up into transfer mechanism 110 and allow the same to escape from system 2000. The term "vaporized" as used herein is used in a conventional sense and is intended to include not only the formation of vapors but also the formation of small aerosol sized particles which, as is known in the art, may be generated by actuation of such device. While any heater unit may be used, preferably the heating unit comprises a heating element which can be readily and reliably charged through use in a conventional outlet.

[0019] Controller 402 may communicate with volatizable materials 102 and 104 or delivery system 2000, or any of their components or subcomponents, in any combination. However, in general, controller 402 either permits vaporization, controls the rate or timing of vaporization or otherwise impacts a characteristic of vaporization.

[0020] For example, in the aforementioned illustrative example where material 102 comprises a fragrance containing material and material 104 is some other vaporizable material, e.g., an insecticide, controller 402 may permit sequential and/or intermittent actuation. For example, in one case, controller 402 may permit substantially constant vaporization of fragrance material 102 and intermittent vaporization of insecticide material 104. However, various other operation modes may be employed.

[0021] Environment 130 corresponds to any defined space, whether open or enclosed by one or more surfaces, walls, ceilings, floors, or other solid or fictitious boundaries, which receives the evaporated material. For example, environment 130 may correspond to a residential room (bedroom, bathroom, kitchen, etc.), commercial space (factory floor,

office cubicles, etc.), automotive enclosure (car, truck, recreational vehicle), airline compartment, or any other space in which it is desirable to deliver a vapor.

[0022] As shown on Fig. 2, delivery system 2000 generally comprises a transfer mechanism 110 and an evaporation region 120.

[0023] Transfer mechanism 110 preferably comprises any component or combination of components configured to communicate with both the first and second volatizable materials and the evaporation region. More specifically, transfer mechanism 110 may comprise one or more devices which may be caused to deliver volatizable materials 102 and 104 to evaporation region 120. Transfer mechanism 110 may, but need not, be contiguous with or physically attached to volatizable materials 102 and 104 or contiguous with or fastened to evaporation region 120. However, in general, transfer mechanism facilitates transport of materials 102 and 104 to environment 130, preferably through evaporation region 120.

[0024] With reference now to Fig. 3, an exemplary embodiment of transfer mechanism 110, may suitably comprise a first wick structure 302 and a second wick structure 304. Preferably, wick structures 302 and 304 operatively communicate with volatizable materials 102 and 104 and evaporation region 120. That is, wick structures 302 and 304 may be contiguous with, attached to, or otherwise in operative communication with volatizable materials 102 and 104. Similarly, wick structures 302 and 304 may be contiguous with, attached to, or otherwise in operative communication with evaporation region 120. As shown, transfer mechanism 110 may be configured with an open area 1100 between two separate sides of the transfer mechanism 110; specifically, wick structures 302 and 304. In this embodiment, as also shown, volatizable materials 102 and 104 suitably comprise liquid materials held in separate containers and delivered

through wick structures 302 and 304, respectively, to evaporation region 120 (described below), and thence to environment 130.

[0025] While Fig. 3 shows an exemplary embodiment of transfer mechanism 110, any transfer mechanism capable of communicating with both volatizable materials 102 and 104 and evaporation region 120, whether now known or hereinafter devised, may be used in the present invention. In this regard, transfer mechanism may comprise suitable wick materials including porous/sintered plastics such as high density polyethylene and polypropylene, bonded fibers, glass sintered fibers, ceramic materials, carbon fibers, sintered carbon, wood, compressed wood composites bundled or woven material fibers, bundled or manmade fibers. In general, the desired transfer material can be formed of any suitable material now known or hereafter devised by those skilled in the art.

[0026] Referring again to Fig. 2, evaporation region 120 preferably comprises any suitable component or combination of components configured to facilitate evaporation of materials from delivery system 2000 into environment 130. Evaporation region 120 may be attached to delivery system 2000 or otherwise contained or maintained in position to communicate with delivery system 2000. Evaporation region 120 may or may not comprise the same material comprising transfer mechanism 110.

[0027] More specifically, referring now to Fig. 3, evaporation region 120 may comprise pads 4000 and 4002, which may be respectively caused to receive volatizable materials 102 and 104 from wick structures 302 and 304 and to release volatizable materials 102 and 104 into the environment, such as by actuation of controller 402. In accordance with an exemplary embodiment of the present invention, pads 4000, 4002 comprise any material that enables the evaporation of volatizable material therefrom. For example, such materials may include porous/sintered plastics such as high density polyethylene and polypropylene, bonded fibers, glass sintered fibers, ceramic materials, carbon fibers,

sintered carbon, wood, compressed wood composites bundled or woven material fibers, bundled or manmade fibers, combinations thereof and/or the like. Further, pads 4000, 4002 may be arranged in any suitable manner using any variety of suitable means that maintains the positioning of the materials relative to each other and does not adversely affect travel of liquid through the material. In general, pads 4000, 4002 employ capillary action to draw volatizable materials 102 and 104 from transfer mechanism 110 and expose material to environment 130 for evaporative release.

[0028] Although the exemplary embodiment of Fig. 3 shows two pads, one or more pads may be used. Pads 4000 and 4002 may, but need not, comprise the same material. Moreover, pads 4000 and 4002 may be shaped in one or more shapes, such as rectangular, elliptical, square, triangular, or any other arbitrary rectilinear or curvilinear shape. Also, pads 4000 and 4002 may, but need not, be physically attached to transfer mechanism 110. Fig. 3, for example, shows an embodiment of the present invention in which pads 4000 and 4002 are respectively attached to wick structures 302 and 304, which in turn are respectively attached to volatizable materials 102 and 104.

[0029] While Fig. 3 shows one embodiment of evaporation region 120, any structure of any configuration which facilitates the receipt and release of volatizable materials 102 and 104 into environment 130, whether now known or hereinafter devised, may be used in the present invention.

[0030] Fig. 3's exemplary embodiment includes controller 402 manipulated manually by the user. Using any suitable conventional electric signal technology controller 402 communicates the user's manual input to the transfer mechanism 110 so as to control the absolute and relative amounts of volatizable materials 102 and 104 from evaporation region 120. Specifically, in this embodiment, transfer mechanism 110 comprises wick structures 302 and 304 which are connected to valves 3000 and 3002. Controller 402

communicates with valves 3000 and 3002 to control the amounts of volatizable materials 102 and 104 reaching evaporation region 120, and thus the amounts released into the environment.

[0031] In another embodiment of the present invention, wick structures 302 and 304 include conventional filament structures which receive signals from controller 402. The filament structures act to alter heat levels in wick structures 302 and 304, thereby controlling the amounts of volatizable materials 102 and 104 reaching evaporation region 120. Alternatively, and in addition, filament structures may be located in volatizable materials 102 and 104, evaporation region 120, or both.

[0032] For the sake of brevity, conventional electrical and mechanical design techniques used in developing various vapor-dispensing devices (and the various components thereof) are not described in detail herein. The devices disclosed herein may be configured through application of general electrical and mechanical principles. Although the embodiments described herein show vapor-dispensing devices that are generally quadrilateral in shape, other design styles could be formulated. Vapor dispensing devices could be readily formulated with angular, round, oval or other shapes, for example, as well as with combinations of multiple shapes and structures. In a further embodiment, the vapor-dispensing device may be adorned with an ornamental design such as a floral design, an outdoor scene, a cartoon or movie character, or the like.

[0033] The particular implementations shown and described herein are examples of the present invention and are not intended to otherwise limit the scope of the present invention in any way. It should be noted that many alternative or additional components or features may be added without departing from the invention this described.